

STUDIES IN THE LIABEAE (ASTERACEAE). II.

PRELIMINARY SURVEY OF THE GENERA

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Two related papers have been concerned with the tribal status of the Liabeae and with the four genera of the Liabeae that have been classified in four separate tribes (Robinson & Brettell 1973; Robinson & Cuatrecasas 1973). The major remaining problems that are treated in this paper involve the detailed analysis of the primary genus, Liabum, and the summary of the revised generic concepts of the tribe.

The present treatment recognizes fourteen genera in the tribe Liabeae with the increase derived entirely from the dissection of the overly expanded concept of Liabum. As conceived by Bentham (1873) and Hoffmann (1894), Liabum included a variety of habits equal to that in the vast genus Senecio. All illusions of an intergrading series disappear on examination of microscopic structures. Supporting evidence is obtained from pollen, style branches, corolla shapes, stipules, raphids, minute details of pappus, stomates on corollas, exothecial cells, nectaries, ray flower length, ornamentation of receptacles, corolla and achene pubescence, carpopodia, filaments and phyllaries. The characters have all proven to correlate rather well with macroscopic features and all the resulting genera can be recognized by a combination of habit, leaf venation, inflorescence form and pappus.

The relationships among the Liabeae prove to be much more complex than previous treatments would indicate. Some general groupings are obvious, however. The Munnozia group is particularly distinct with the black anthers, distinct disk corolla tubes, very prominent rays, short raphids in the achenes and short style branches. The Paranephelius group has pale anthers large pollen with simple spines, long raphids in the achenes and long style branches. The Liabum group has comparatively small spores and rather short rays and includes many variations having sometimes shrubby habits or filiform style branches, short raphids in the achenes, very narrow tubes of the disk corollas or corolla lobes without evident stomata. The remaining groups including Sinclairia and Austroliabum have long raphids in the achenes, large pollen with more complex spines and intermediate length style branches. The analysis of the tribe indicates that the reduced habit of a few more basal leaves and a small scapose inflorescence has evolved in four

separate groups, Liabum, Liabellum, Chrysactinium and Pseudonosseris. The eppapose condition has evolved in two genera, Cacosmia and Philoglossa.

Most of the microscopic characters used in the tribe are easily seen in dissections but two characters require special notice. The raphids in the achene wall are inside the cells of the various layers and usually cannot be seen without a clearing agent. A clearing agent such as Hoyer's solution is definitely required to observe the differentiated cell tips in the pappus of Liabum, Oligactis and Chionopappus. In water only the slightest differentiation of the cell tips can be seen but the combination of clearing and the altered index of refraction in Hoyer's solution reveals a very small thin-walled acumination or apiculus on the tip of each tooth. The pappus character is often difficult to see but in only one species in the group of three genera, Liabum domingense, has it proven to be lacking.

This study has benefited from reference to extensive notes maintained by Dr. Jose Cuatrecasas and from Liabum material on loan to Dr. Cuatrecasas from the Field Museum in Chicago.

The genera can be distinguished by the following keys. The first key uses the more obvious characters while the second key attempts to reflect more of the relationships.

Key to Genera

1. Corolla tube abruptly expanding into rather tubular base of limb; anther thecae partly or totally black; style branches rather short, not more than ten times as long as wide; heads usually on very long slender unbranched peduncles, never congested 2
1. Corolla tube gradually expanding into limb; anther thecae pale or brownish; style branches short to very elongate, sometimes filiform; heads never on very long slender unbranched peduncles, often congested 4
2. Pappus very vestigial or lacking; at least the stipules of the leaves bearing hairs with much enlarged basal cells; tube of disk corolla 2-3 times as long as wide Philoglossa
2. Pappus with prominent setae or squamae or both; leaves not bearing hairs with much enlarged basal cells; tube of disk corolla much longer 3
3. Plants with leaves in basal rosettes; inflorescence of single heads on very long unbranched peduncles; corolla lobes with short-stalked capitate glands scattered over outer

surface, without longer glands or hairs; anther collars with prominent transverse annular thickenings obscuring cell pattern Chrysactinium

3. Plants small to robust herbs with distinct leafy stems, usually with branching inflorescence; corolla lobes usually with elongate hairs or glands near tips; anther collars with annular thickenings not obscuring cell limits Munnozia
4. Plant a basal rosette with heads sessile and immersed Paranephelius
4. Plant with heads raised on short to elongate pedicels 5
5. Pappus completely absent, achene completely glabrous Cacosmia
5. Pappus present, achene with at least a few glands or setae 6
6. Pappus setae plumose, in one series; corollas of disk flowers red or purple Chionopappus
6. Pappus not plumose, usually in more than one series; all flowers yellow 7
7. Inflorescence with all or all but most basal bracts and branches subopposite and alternate; receptacle minimally alveolate, without any hairs, chaff or projections 8
7. Inflorescence with all or with primary bracts and branching opposite; receptacle with minute hairs or chaff or projections 10
8. Pappus with inner setae broadened and flattened like outer squamae; small high elevation plants Angelianthus
8. Pappus with setae narrow and mostly terete 9
9. Plants with leaves in basal rosette, leaf venation essentially pinnate; pollen spines simple without evident multiple chambering at base Pseudonosoris
9. Plants with prominent erect leafy stems, primary leaves prominently trinervate; spines of pollen with distinct complex chambering in base Austroliabum
10. Plants shrubs, vines or trees; leaves with pinnate venation

- achenes bearing both glands and setae 11
10. Plants small to large herbs; leaves rather prominently tri-nervate; achenes with or without glands 12
11. Scandent shrubs; leaf bases not stipulate or with only adjacent lobe on node; raphids in walls of achene quadrate; tips of cells of pappus teeth with specialized thin walled mucro Oligactis
11. Shrubs and small trees; leaf bases with stipules fused into small sheath; raphids in walls of achene elongate; tips of cells of pappus teeth not specialized Ferreyranthus
12. Leaves deeply palmately lobed; small few headed plants with underground tuber Liabellum
12. Leaves dentate to entire, not palmately lobed; small to larger herbs without underground tuber 13
13. Petiole bases and nodes without wings or lobes, leaves sometimes in whorls of three or more; stems usually not white tomentose, mostly terete; inflorescence in thyrsoid or corymbose panicle; ray flowers often lacking; pollen grains 35-50 μ in diam.; achenes with elongate raphids in walls; tips of teeth of pappus setae not specialized Sinclairia
13. Petiole bases or nodes with wings or lobes, leaves always opposite; stems always white tomentose or flocculose pubescent; inflorescence a cymose panicle; ray flowers always present; pollen grains 25-35 μ in diam; achenes with quadrate raphids in walls; tips of cells in pappus teeth with thin-walled mucro Liabum

Alternative Key

1. Anther thecae black; peduncles usually elongate; corollas abruptly expanded above tube; style branches rather short Munnozia, Chrysactinium, Philoglossa
1. Anther thecae pale; peduncles usually short; style branches often very long 2
2. Pappus in one row or lacking; achene without distinct carpodium 3
2. Pappus in 2-3 rows; achene with distinct carpodium 4

3. Pappus lacking; corolla lobes without stomata; heads with few broad rays Cacosmia
3. Pappus with plumose setae; corolla lobes with stomata near margin; heads with many narrow rays Chionopappus
4. Pappus with tips of projecting cells bearing a minute thin-walled mucro; walls of achenes with cells containing quadrate raphids; pollen grains 25-35 μ in diam. corolla lobes without evident stomata 5
4. Pappus with tips of projecting cells not specialized; walls of achenes with cells containing elongate raphids; pollen grains mostly 35-50 μ in diam; corolla lobes usually with evident stomata 6
5. Plant small to large herbs; leaves slightly to strongly trinervate; inflorescence cymose or subcymose; achenes with only setae and no glands Liabum
5. Plants scandent shrubs; leaves pinnately veined; inflorescence a corymbose or thyrsoid panicle; achene with glands and setae Oligactis
6. Plants with leaves mostly in basal rosettes; pollen grains with spines simple internally 7
6. Plants with prominent erect leafy stems; pollen grains with spine bases intricately chambered internally 9
7. All pappus elements flattened Angelianthus
7. All least inner pappus elements capillary 8
8. Heads sessile in basal rosette; receptacle with high ridges enclosing bases of achenes; phyllaries rather broad and blunt Paranephelius
8. Heads on laxly branched scape; receptacle nearly smooth; phyllaries rather narrow with long slender tips Pseudonosotis
9. Shrubs or small trees; upper surfaces of leaves usually rugose, leaf venation pinnate Ferreyranthus
9. Herbs or straggling shrubs; upper surfaces of leaves rather smooth, leaf venation prominently trinervate 10
10. Most or all bracts and branches of inflorescence subopposite

or alternate; achene narrowed at base with small carpopodium, ribs very prominent; leaves never in whorls; ray flowers always present Austroliabum

10. Most bracts and branches of inflorescence opposite; achene cylindrical with very large carpopodium, ribs rather weak; leaves often in whorls; ray flowers often lacking 11
11. Leaves sessile or winged to base, palmately lobed; small plants with basal tuber Liabellum
11. Leaves petiolate without wings or stipules, not lobes; plants without basal tuber Sinclairia

ANGELIANTHUS H. Robinson & R.D. Brettell nom. nov. Liabellum Cabrera, Not. Mus. La Plata 17, Bot. no. 84:76. 1954. (not Liabellum Rydberg) T. Liabellum humile Cabrera, originally monotypic.

The genus is named for Dr. Angel L. Cabrera, the author of the species.

Angelianthus humilis (Cabrera) H. Robinson & R.D. Brettell, comb. nov. Liabellum humile Cabrera, Not. Mus. La Plata 17, Bot. No. 84:78. 1954.

AUSTROLIABUM H. Robinson & R.D. Brettell, genus novum Asteracearum (Liabeae). Plantae herbaceae vel suffruticentes. Folia opposita vel subopposita distincte petiolata, petiolis alatis vel base stipulatis, laminis triangularibus vel lanceolatis subtus vel utrinque albo-tomentosis, nervis basilaribus trifidis. Inflorescentiae plerumque cymosae superne alternate ramosae, pedicellis saepe elongatis. Capitula late campanulata; squamae involucri ca. 3-4 seriatæ inaequales vel subaequales anguste attenuatae extus plerumque glandulis longiuscule stipitatis dense obsitae; receptacula admodum glabra. Flores ca. 50-200; radii 1-2-seriati longi, corollis base perangustis hirsutis; corollae disci inferne sensim perangustae parce hirsutae, lobis elongatis plerumque glabris ad apicem hirsutis marginaliter stomatiferis; filamenta antherarum laevia vel papillosa; thecae pallidae base subfimbriatae, cellulis exothecialibus ovalis irregulariter ornatis in extremis nodiferis, appendices longe ovatae 1-1/2 - 2 longiores quam latiores laeves; rami stylorum ca. 15 longiores quam latiores. Achaenia oborata inferne distincte angustiora valde 10-costata dense setifera, raphidibus elongatis; carpopodia angusta, cellulis plerumque 3-5-seriatis aliquantum parvis, parietibus subcrassis; series pappi exteriores mediocriter vel manifeste squamiformes interiores setiformes plerumque facile deciduae, apicibus cellularum simplicibus. Grana pollinis 35-45µ diam., spinis

irregularibus interne intricatis. Species typica: Liabum candidum Griseb.

Austroliabum candidum (Griseb.) H.Robinson & R.D.Brettell, comb. nov. Liabum candidum Griseb., Symbolae 203. 1979.

Austroliabum eremophilum (Cabrera) H.Robinson & R.D.Brettell, comb. nov. Liabum eremophilum Cabrera, Bol. Soc. Arg. Bot. 2:96. 1947.

Austroliabum mulgediifolium (Muschler) H.Robinson & R.D.Brettell, comb. nov. Liabum mulgediifolium Muschler, Engl. Bot. Jahrb. 50, Beibl. III:85. 1913.

Austroliabum polymnioides (R.E.Fries) H.Robinson & R.D.Brettell, comb. nov. Liabum polymnioides R.E.Fries, Arkiv Bot. 5(13):24. pl. 1, fig. 10-11. 1906.

CACOSMIA H.B.K., Nov. Gen. et Sp. 4:227. ed. fol. 1818.
T. Cacosmia rugosa H.B.K., originally monotypic.

Cacosmia rugosa H.B.K., Nov. Gen. et Sp. 4:228, ed. fol. 1818.

CHIONOPAPPUS Benth. in Benth. & Hook f. Gen. 3:485. 1873.
T. Chionopappus benthamii Blake, Journ. Wash. Acad. Sci. 25:492. 1935. monotypic, originally described without named species.

Chionopappus benthamii Blake, Journ. Wash. Acad. Sci. 25:492. 1935.

CHRYSACTINIUM (H.B.K.) Wedd., Chlor. And. 1:212. 1856.
Andromachia sect. Chrysactinium H.B.K., Nov. Gen. & Sp. 4:77 ed. fol. 1818. LT.: Andromachia acaulis H.B.K., present designation.

Chrysactinium acaule (H.B.K.) Wedd., Chlor. And. 1:212. 1857.
Ancromachia acaulis H.B.K., Nov. Gen. et Sp. 4:77 ed. fol. 1818.

Chrysactinium amphothrix (Blake) H.Robinson & R.D.Brettell, comb. nov. Liabum amphothrix Blake, Journ. Wash. Acad. Sci. 17:290. 1927.

Chrysactinium arthrothrix (Blake) H.Robinson & R.D.Brettell, comb. nov. Liabum arthrothrix Blake, Journ. Wash. Acad. Sci. 17:288. 1927.

Chrysactinium bicolor (Blake) H.Robinson & R.D.Brettell, comb. nov. Liabum bicolor Blake, Jour. Wash. Acad. Sci. 17:290. 1927.

Chrysactinium caulescens (Hieron.) H. Robinson & R.D. Brettell,
comb. nov. Liabum caulescens Hieron., Engl. Bot. Jahrb.
36:500. 1905.

Chrysactinium erigeroides (Benth.) H. Robinson & R.D. Brettell,
comb. nov. Liabum erigeroides Benth., Pl. Hartw. 206. 1845.

Chrysactinium hieracioides (H.B.K.) H. Robinson & R.D. Brettell
comb. nov. Andromachia hieracioides H.B.K., Nov. Gen. et
Sp. 4:77 ed. fol. 1818.

Chrysactinium longiradiatum (Hieron.) H. Robinson & R.D. Brettell,
comb. nov. Liabum longiradiatum Hieron., Engl. Bot. Jahrb.
21:352. 1895.

Chrysactinium rosulatum (Hieron.) H. Robinson & R.D. Brettell,
comb. nov. Liabum rosulatum Hieron., Engl. Bot. Jahrb.
36:501. 1905.

Chrysactinium tenuius (Blake) H. Robinson & R.D. Brettell,
comb. nov. Liabum tenuius Blake, Jour. Wash. Acad. Sci.
17:289. 1927. ("tenuior").

FERREYANTHUS H. Robinson & R.D. Brettell, genus novum Asteracearum (Liabeae). Plantae fruticentes vel subarborescentes. Folia opposita, petiolis brevibus saepe alatis base breviter vaginatis connatis, laminis ovatis vel ellipticis supra plerumque rugosis subtus albo-tomentosis, nervis pinnatis. Inflorescentiae corymboso-paniculatae, pedicellis aliquantum brevibus angustis. Capitula late campanulata; squamae involucri ca. 5-seriatae valde inaequales acutae; receptacula breviter distincte paleacea. Flores ca. 20-25; radii uniseriati breves, corollis base perangustis; corollae disci anguste infundibulares, tubis aliquantum latae indistinctae glabrae, lobis elongatis superne pauca setiferis vel breviter glanduliferis marginaliter stomatiferis; filamenta antherarum glabra vel hirsuta; thecae plerumque pallidae base valde fimbriatae, cellulis exothecialibus ovalis in extremis nodiferis, appendices oblongo-ovatae 1-1/2 - 2 longiores quam latiores laeves; rami stylorum ca 10-12 longiores quam latiores. Achaenia prismatica inferne parum angustiora leniter 10-costata varie setifera et glandulifera, raphidibus elongatis; carpopodia obturaculiformia, cellulis aliquantum parvis, parietibus crassis; series pappi exteriores anguste squamiformes interiores setiformes persistentes, apicibus cellularum simplicibus. Grana pollinis 25-40 μ diam, spinis irregularibus interne intricatis. Species typica: Andromachia verbascifolia H.B.K.

Ferreyranthus excelsus (Poepp. & Endl.) H. Robinson & R.D. Brettell,
comb. nov. Andromachia excelsum Poepp. & Endl., Nov. Gen.
& Sp. 3:44. 1843.

Ferreyranthus pseudosalviifolius (Hieron.) H. Robinson & R.D.
Brettell, comb. nov. Liabum pseudosalviifolium Hieron.,
Engl. Bot. Jahrb. 36:502. 1905.

Ferreyranthus rugosus (Ferreyra) H. Robinson & R.D. Brettell, comb.
nov. Liabum rugosum Ferreyra, Publ. Mus. "Javier Prado"
Bot. 20:3. 1965.

Ferreyranthus tovari (Cabrera) H. Robinson & R.D. Brettell, comb.
nov. Liabum tovari Cabrera, Bol. Soc. Argent. Bot. 10:29.
1962.

Ferreyranthus vaginans (Muschler) H. Robinson & R.D. Brettell,
comb. nov. Liabum vaginans Muschler, Engl. Bot. Jahrb.
50, Beibl. III:79. 1913.

Ferreyranthus verbascifolius (H.B.K.) H. Robinson & R.D. Brettell.
comb. nov. Andromachia verbascifolia H.B.K., Nov. Gen.
& Sp. 4:79 ed. fol. 1818.

Ferreyranthus vernonioides (Muschler) H. Robinson & R.D. Brettell.
comb. nov. Liabum vernonioides Muschler, Engl. Bot.
Jahrb. 50, Beibl. III:80. 1913.

LIABELLUM Rydberg, North Am. Flora 34:294. 1927. T.:
Liabum palmeri A. Gray, original designation.

Liabellum angustissimum (Gray) Rydb., North Am. Flora 34:295.
1927. Liabum angustissimum Gray, Proc. Amer. Acad. 22:432. 1887.

Liabellum cervinum (B.L. Rob.) Rydb., North Am. Flora 34:294. 1927.
Liabum cervinum B.L. Rob., Proc. Amer. Acad. 29:317. 1894.

Liabellum palmeri (Gray) Rydb., North Am. Flora 34:295. 1927.
Liabum palmeri Gray, Proc. Amer. Acad. 22:432. 1887.

LIABUM adans., Fam. 2:131. 1763. Lt.: Liabum brownei
Cass. = Liabum umbellatum (L.) Sch. Bip. Starkea Willd., Sp.
Pl. 3:2216. 1803. T.: Amellus umbellata L., originally
monotypic. Andromachia Humb. & Bonpl., Pl. Aequin. 2:104. 1809.
T.: Andromachia igniaria Bonpl. Allendea Llav. & Lex., Nov.
Veg. Deser. 1:10. 1824. T.: Allendea lanceolata Llav. & Lex. =
Liabum bourgeauii. Viviania Willd. ex Less., Linnaea 4:318.
4:318. 1829. T.: Viviania bicolor Willd. = Liabum melastomoides
(H.B.K.) Less.

- Liabum acuminatum Rusby, Descr. S. Amer. Pl. 161.1920.
- Liabum acutifolium Cuatr., Collect. Bot., Barcinone 3:299.1953.
- Liabum amplexans Blake, Journ. Wash. Acad. Sci. 17:292.1927.
- Liabum amplexicaule Poepp. & Endl., Nov. Gen. et Sp. 3:43.1843.
- Liabum asclepiadeum Sch. Bip., Linnaea, 20:521.1847.
- Liabum barahonense Urb., Arkiv. Bot. 23A:85. 1931.
- Liabum bourgeauii Hieron.; Ule, Verh. Bot. Ver. Prov. Brand.
48:208.1907.
- Liabum caliense Hieron., Engl. Bot. Jahrb. 28:623. 1901.
- Liabum cubense Sch.Bip., Journ. Bot. 1:236. 1863.
- Liabum domingense Rydb. North Am. Flora 34:291.1927.
- Liabum eggessii Hieron., Engl. Bot. Jahrb. 28:624.1901.
- Liabum eriocaulon Poepp. & Endl. Nov. Gen. & Sp. 3:43. t.
249.1843.
- Liabum falcatum Rusby, Descr. S. Amer. Pl. 161.1920.
- Liabum floribundum Less., Linnaea 6:702. 1831.
- Liabum grandiflorum (H.B.K.) Less., Linnaea 6:698.1831.
Andromachia grandiflora H.B.K., Nov. Gen. et Sp.
4:77. ed. fol. 1818.
- Liabum igniarium (H.B.K.) Less. Linnaea 6:701.1831.
Andromachia igniaria H.B.K. Pl. Aequin. 2:104.1812.
- Liabum lehmannii Hieron., Engl. Bot. Jahrb. 19:61. 1894.
- Liabum longipes Urb., Fedde, Rep. Sp. Nov. 26:115.1929.
- Liabum melastomoides (H.B.K.) Less., Linnaea 6:699.1831.
Andromachia melastomoides H.B.K., Nov. Gen. et Sp.
4:79 ed. fol. 1818.
- Liabum nigro-pilosum Hieron., Engl. Bot. Jahrb. 29:59. 1900.
- Liabum oblanceolatum Urb. & Ekm., Arkiv. Bot. 23A:89.1931.

Liabum ovatifolium Urb., Arkiv. Bot. 23A:86.1931.

Liabum polycephalum Urb., Arkiv. Bot. 23A:88.1931.

Liabum selleanum Urb., Arkiv. Bot. 23A:26.1931.

Liabum solidagineum (H.B.K.) Less., Linnaea 6:700.1831.

Andromachia solidaginea H.B.K., Nov. Gen. et Sp. 4:78 ed. fol. 1818.

Liabum stipulatum Rusby, Descr. S. Amer. Pl. 160.1920.

Liabum stuebelii Hieron., Engl. Bot. Jahrb. 21:353.1895.

Liabum subacaule Rydb., North Am. Flora 34:290.1927.

Liabum subumbellatum Rusby, Descr. S. Amer. Pl. 159. 1920.

Liabum ulei Hieron, Verh. Bot. Ver. Brand. 1906, 68:206.1907.

Liabum umbellatum (L.) Sch. Bip. Journ. Bot. 1:236.1863.

Amellus umbellatus L., Syst. Nat. ed. 10.1225. 1759.

Liabum weberbaueri Muschler, Engl. Bot. Jahrb. 50, Beibl. III: 78. 1913.

Liabum wrightii Griseb. Mem. Am. Acad. n. ser. 8:515.1862.

Liabum wurdackii Ferreyra, Publ. Mus. Hist. Nat. "Javier Prado" Bot. Ser. B. 20:2.1965.

MUNNOZIA Ruiz & Pavon, Prod. Fl. Per. 108. 1794. LT.:

Munnozia lanceolata Ruiz & Pavon, present designation. The genus was originally described with mention of two unnamed species (Ruiz & Pavon 1794). Four species were later described (R & P. 1798). Cabrera (1960) in his notes of the types of the four species indicated that only two had been annotated as new genus. Of these two, M. lanceolata seems the most completely known and it is here selected as the lectotype.

Key to Subgenera

1. Exothecial cells quadrate with thickenings on both transverse and vertical walls; pappus with lacerate or triangular outer squamae and very few inner setae. Kastnera
1. Exothecial cells without evident thickenings on vertical walls; pappus with numerous setae and with few or no outer squamae

2. Leaves densely tomentose below, trinervate near base;
nectaries not very long; achenes mostly 8-10 ribbed

Munnozia

2. Leaves nearly glabrous on both sides, with 5-7 veins
radiately from base nectaries elongate; achenes mostly
5-ribbed.

Erato

Munnozia subgenus Munnozia. Alibum Less., Syn. Comp. 152.
1832. T. Alibum liaboides Less. = Munnozia lyrata, originally
monotypic. Prionolepis Poepp. & Endl., Nov. Gen. et Sp. 3:55,
t.261. 1845. T. Prionolepis silphioides Poepp. & Engl., originally
monotypic. Liabum subgenus Chrysartrum Willd. ex Sch. Bip.,
Flora 36:37. 1853. T. Liabum sagittatum Sch. Bip., present
designation. Chrysastrum (Sch.Bip.) Willd. ex Wedd., Chlor.
And. 1:211, in nota. 1857. T. Liabum sagittatum Sch. Bip.

Munnozia acostae (Chung) H.Robinson & R.D.Brettell, comb. nov.
Liabum acostae Chung, Phytologia 14(6):323.1967.

Munnozia affinis (Blake) H. Robinson & R.D.Brettell, comb. nov.
Liabum affine Blake, Journ. Wash. Acad. Sci. 17:301.1927.

Munnozia angusta (Blake) H.Robinson & R.D. Brettell, comb. nov.
Liabum angustum Blake, Journ. Wash. Acad. Sci. 17:295.1927.

Munnozia attenuata Rusby, Bull. Torrey Bot. Cl. 54:317.1927.

Munnozia canarensis (Cuatr.) H.Robinson & R.D.Brettell, comb.
nov. Liabum canarense Cuatr., Brittonia 8:46.1954.

Munnozia cardenasii (Cabrera) H.Robinson & R.D.Brettell, comb.
nov. Liabum cardenasii Cabrera, Not. Mus. La Plata, Bot.
14:191.1949.

Munnozia chrysanthemoides Rusby, Bull. Torrey Bot. Cl. 54:313.1927.

Munnozia convencionensis (Cuatr.) H.Robinson & R.D.Brettell,
comb. nov. Liabum convencionense Cuatr., Collect. Bot.,
Barcinone 3:300.1953.

Munnozia corymbosa Ruiz & Pavon, Syst. Veg. Peruv. Chil. 195. 1798.

Munnozia eriocalyx (Blake) H.Robinson & R.D.Brettell, comb. nov.
Liabum eriocalyx Blake, Journ. Wash. Acad. Sci. 17:297.1927.

Munnozia foliosa Rusby, Bull. Torrey Bot. Cl. 54:312.1927.

- Munnozia gigantea (Rusby) Rusby, Bull. Torrey Bot. Cl. 54:312.1927.
Liabum giganteum Rusby, Bull. N.Y.Bot. Gard. 4:391.1907.
- Munnozia glandulosa (O.Ktze.) Rusby, Bull. Torrey Bot. Cl. 54:314.
1927. Liabum glandulosum O.Ktze., Rev. Gen. 3(2):163. 1898.
- Munnozia hastifolia (Poepp. & Endl.) H.Robinson & R.D.Brettell,
comb. nov. Liabum hastifolium Poepp. & Endl., Nov. Gen. & Sp.
3:43.1843.
- Munnozia herrerae (Cabrera) H.Robinson & R.D.Brettell, comb. nov.
Liabum herrerae Cabrera, Rev. Univ. Cuzco, 33(87):119.1945.
- Munnozia hirta (O.Ktze.) Rusby, Bull. Torrey Bot. Cl. 54:314.1927.
Liabum hirtum O. Ktze., Rev. Gen. 3(2): 163. 1898.
- Munnozia isodonta (Blake) H.Robinson & R.D.Brettell, comb. nov.
Liabum isodontum Blake, Journ. Wash. Acad. Sci. 17:298.1927.
- Munnozia jussieui (Cass.) H.Robinson & R.D.Brettell, comb. nov.
Andromachia jussieui Cass., Bull. Soc. Philom. 184.1817.
- Munnozia klattii H.Robinson & R.D.Brettell, nom.nov. Liabum
corymbosum Sch. Bip. ex Klatt, Annal. Naturh. Hofmus Wien.
9:363.1894.
- Munnozia lanceolata Ruiz et Pavon, Syst. Veg. 196. 1798.
- Munnozia longifolia Rusby, Bull. Torrey Bot. Cl. 54:313.1927.
- Munnozia lyrata (Gray) H.Robinson & R.D.Brettell, comb. nov.
Liabum lyratum Gray, Proc. Am. Acad. 5:115.1861.
- Munnozia megacephala (Sch.Bip.) H.Robinson & R.D.Brettell,
comb. nov. Liabum megacephalum Sch. Bip., Flora 36:38.1853.
- Munnozia nonoensis (Hieron.) H.Robinson & R.D.Brettell, comb.
nov. Liabum nonoense Hieron., Engl. Jahrb. 29:59.1900.
- Munnozia olearioides (Muschler) H.Robinson & R.D.Brettell,
comb. nov. Liabum olearioides Muschler, Engl. Bot. Jahrb.
50, Beibl. III:82.1913.
- Munnozia oxyphylla (Cuatr.) H.Robinson & R.D.Brettell, comb.
nov. Liabum oxyphyllum Cuatr., Collect. Bot., Barcinone,
3:303.1953.
- Munnozia perfoliata (Blake) H.Robinson & R.D.Brettell, comb.
nov. Liabum perfoliatum Blake, Journ. Wash. Acad. Sci.
17:291.1927.

Munnozia peruensis (Cuatr.) H. Robinson & R.D. Brettell, comb.
nov. Liabum peruese Cuatr., Collect. Bot., Barcinone
3:304. 1953.

Munnozia pinnulosa (O. Ktze) H. Robinson & R.D. Brettell, comb.
nov. Liabum pinnulosum O. Ktze. Rev. Gen. 3 (2):163. 1898.

Munnozia pulchra (Blake) H. Robinson & R.D. Brettell, comb. nov.
Liabum pulchrum Blake, Journ. Wash. Acad. Sci. 17:299. 1927.

Munnozia rusbyi (Britton) Rusby, Bull. Torrey Club 54:312. 1927.
Liabum rusbyi Britton, Bull. Torrey Bot. Cl. 19:263. 1892.

Munnozia sagittata (Sch. Bip.) H. Robinson & R.D. Brettell, comb.
nov. Liabum sagittatum Sch. Bip., Flora 36:37. 1853.

Munnozia senecionidis Benth., Pl. Hartw. 134. 1844.

Munnozia silphioides (Poepp. & Endl.) H. Robinson & R.D. Brettell,
comb. nov. Prionolepis silphioides Poepp. & Endl., Nov. Gen.
3:55. pl. 261. 1845.

Munnozia strigulosa Rusby, Bull. Torrey Bot. Cl. 54:317. 1927.

Munnozia subviride (Blake) H. Robinson & R.D. Brettell, comb.
nov. Liabum subviride Blake, Journ. Wash. Acad. Sci.
17:294. 1927.

Munnozia tabanensis (Cuatr.) H. Robinson & R.D. Brettell, comb.
nov. Liabum tabanense Cuatr., Caldasia 3:425. 1945.

Munnozia taeniotricha (Blake) H. Robinson & R.D. Brettell, comb.
nov. Liabum taeniotrichum Blake, Journ. Wash. Acad. Sci.
17:298. 1927.

Munnozia trinervis Ruiz & Pavon, Syst. Veg. 195. 1798.

Munnozia venosissima Ruiz & Pavon, Syst. Veg. 195. 1798.

Munnozia subgenus Erato (DC.) H. Robinson & R.D. Brettell,
Stat. nov. Erato DC., 5:318. 1836. T. Erato polymnioides DC.,
originally monotypic.

Munnozia (Erato) anatina (Benoist) H. Robinson & R.D. Brettell,
comb. nov. Liabum anatinum Benoist, Bull. Soc. Bot.
France. 84:633. 1938.

Munnozia (Erato) polymnioides (DC.) H. Robinson & R.D. Brettell,
comb. nov. Erato polymnioides DC., Prod. 5:318. 1836. Syn.
Liabum pallatangense Hieron., Engl. Bot. Jahrb. 29:60. 1900.

Munnozia (Erato) sodiroid (Hieron.) H.Robinson & R.D.Brettell, comb. nov. Liabum sodiroid Hieron., Engl. Bot. Jahrb. 29:61.1900.

Munnozia (Erato) stenolepis (Blake) H.Robinson & R.D.Brettell, comb. nov. Liabum stenolepis Blake, Journ. Wash. Acad. Sci. 17:302.1927.

Munnozia (Erato) vulcanica (Klatt) H.Robinson & R.D.Brettell, comb. nov. Liabum vulcanicum Klatt, Engl. Bot. Jahrb. 8:47.1887.

Munnozia subgenus Kastnera (Sch.Bip.) H.Robinson & R.D.Brettell, stat. nov. Kastnera Sch.Bip., Flora 36:37.1853. T.Kastnera tenera Sch.Bip., originally monotypic.

Munnozia (Kastnera) annua (Muschler) H.Robinson & R.D.Brettell, comb. nov. Liabum annuum Muschler, Engl. Bot. Jahrb. 50, Beibl. III:84.1913.

Munnozia (Kastnera) nivea (Hieron.) H.Robinson & R.D.Brettell, comb. nov. Liabum niveum Hieron., Engl. Bot. Jahrb. 19:62.1894.

Munnozia (Kastnera) pinnatipartitum (Hieron.) H.Robinson & R.D. Brettell, comb. nov. Liabum pinnatipartitum Hieron., Engl. Bot. Jahrb. 29:62.1900.

Munnozia (Kastnera) tenera (Sch.Bip.) H.Robinson & R.D.Brettell, comb. nov. Kastnera tenera Sch.Bip., Flora 36:38.1853.

OLIGACTIS (H.B.K.) Cass., Dict.Sci.Nat. 36:16. 1825.
Andromachia sect. Oligactis H.B.K., Nov. Gen. et Sp. 4:79.ed. fol. 1818. LT.: Andromachia volubilis H.B.K., present designation.

Oligactis subgenus Oligactis Heads clustered in short subumbellate, spiciform or racemiform axillary or terminal branches, anther appendages papillose.

Oligactis biattenuata (Rusby) H.Robinson & R.D.Brettell, comb. nov. Liabum biattenuatum Rusby, Descr. S. Amer. Pl. 159.1920.

Oligactis boyacensis (Cuatr.) H.Robinson & R.D.Brettell, comb. nov. Liabum boyacensis Cuatr., Not. Fl. Colomb. 6:36.1944; Rev. Acad. Colomb. 6:61.1944.

Oligactis latifolia (Hieron.) H.Robinson & R.D.Brettell, comb. nov. Liabum volubile (H.B.K.) Less.v. latifolium Hieron., Engl. Bot. Jahrb. 28:622.1901.

Oligactis mikanioides (Blake) H.Robinson & R.D.Brettell, comb. nov. Liabum mikanioides Blake, Journ. Wash. Acad. Sci. 17:294.1927.

- Oligactis nubigena (H.B.K.) Cass., Dict. Sc. Nat. 36:16.1825.
Andromachia nubigena H.B.K., Nov. Gen. et Sp. 4:79 ed. fol.
1818.
- Oligactis sessiliflora (H.B.K.) H.Robinson & R.D.Brettell, comb.
nov. Andromachia sessiliflora H.B.K., Nov. Gen. et Sp. 4:80
ed. fol. 1818.
- Oligactis valeri (Standl.) H.Robinson & R.D.Brettell, comb. nov.
Liabum valeri Standl., Publ. Field. Mus. Nat. Hist. Chicago,
Bot. Ser., 18:1490.1938.
- Oligactis volubilis (H.B.K.) Cass., Dict. Sc. Nat. 36:17.1825.
Andromachia volubilis H.B.K., Nov. Gen. et Sp. 4:80.
ed. fol. 1818.
- Oligactis subgenus Andromachiopsis H.Robinson & R.D.Brettell,
subgenus novum. Plantae frutescentes subscandentes; inflorescentiae
corymboso-paniculatae; appendices antherarum laeves. T. Liabum
pichinchense Hieron.
- Oligactis (Andromachiopsis) coriacea (Hieron.) H.Robinson & R.D.
Brettell, comb. nov. Liabum coriaceum Hieron. Engl. Bot.
Jahrb. 29:58.1900.
- Oligactis (Andromachiopsis) cusalaguensis (Hieron.) H.Robinson &
R.D.Brettell, comb. nov. Liabum cusalaguense Hieron.,
Engl. Bot. Jahrb. 29:55.1900.
- Oligactis (Andromachiopsis) ecuadoriensis (Hieron.) H.Robinson &
R.D.Brettell, comb. nov. Liabum ecuadoriense Hieron.,
Engl. Bot. Jahrb. 19:60.1894.
- Oligactis (Andromachiopsis) fruticosa (Muschler) H.Robinson &
R.D.Brettell, comb. nov. Liabum fruticosum Muschler, Engl.
Bot. Jahrb. 50, Beibl. III:81.1913.
- Oligactis (Andromachiopsis) granatensis (Cuatr.) H.Robinson &
R.D. Brettell, comb. nov. Liabum granatensis Cuatr.,
Fedde, Rep. Sp. Nov. 55:128.1953.
- Oligactis (Andromachiopsis) hallii (Hieron.) H.Robinson &
R.D.Brettell, comb. nov. Liabum hallii Hieron., Engl.
Bot. Jahrb. 29:57.1900.
- Oligactis (Andromachiopsis) ochracea (Cuatr.) H.Robinson &
R.D.Brettell, comb. nov. Liabum ochraceum Cuatr.,
Collect. Bot., Barcinone 3:302.1953.
- Oligactis (Andromachiopsis) pastoensis (Cuatr.) H.Robinson &
R.D.Brettell, comb. nov. Liabum pastoense Cuatr., Not.

Fl. Colomb. 6:36.1944; Rev. Acad. Colomb. 6:62.1944.

Oligactis (Andromachiopsis) pichinchensis (Hieron.) H. Robinson & R.D. Brettell, comb. nov. Liabum pichinchense Hieron., Engl. Bot. Jahrb. 29:56.1900.

Oligactis (Andromachiopsis) scandens (Domke) H. Robinson & R.D. Brettell, comb. nov. Liabum scandens Domke in Diels, Bibl. Bot. no. 116.167. 1937

PARANEPHELIUS Poepp. & Endl., Nov. Gen. et Sp. 3:42. t. 248. 1843. T.: Paranephelius uniflorus Poepp. & Endl., originally monotypic.

Paranephelius asperifolius (Muschler) H. Robinson & R.D. Brettell, comb. nov. Liabum asperifolium Muschler, Engl. Bot. Jahrb. 50, Beibl. III:78.1913.

Paranephelius bullatus Gray ex Wedd. Chlor. And. 1:214.1855.

Paranephelius jelskii (Hieron.) H. Robinson & R.D. Brettell, comb. nov. Liabum jelskii Hieron., Engl. Bot. Jahrb. 36:499.1905.

Paranephelius ovatus Wedd., Chlor. And. 1:214, t.37B.1855.

Paranephelius uniflorus Poepp. & Endl., Nov. Gen. & Sp. 3:42. t.248.1843.

PHILOGLOSSA DC., Prod. 5:567.1836. T. Philoglossa peruviana DC., originally monotypic.

Philoglossa blakei H. Robinson & J. Cuatrecasas, Phytologia 26(5): 383.1973.

Philoglossa mimuloides (Hieron.) H. Robinson & J. Cuatrecasas Phytologia 26(5):384.1973. Juamea mimuloides Hieron., Engl. Bot. Jahrb. 29:52.1900.

Philoglossa peruviana DC., Prod. 5:567.1836.

Philoglossa pterocarpa Sandwith, Kew Bull. 1956:292.1956.

PSEUDONOSERIS H. Robinson & R.D. Brettell, genus novum Asteracearum (Liabeae). Plantae herbaceae quasi acaulescentes. Folia opposita oblanceolata crenata vel lobata sessilia base parum auriculata supra rugosa vel sublaevia subtus albo-tomentosa, nervis pinnatis. Inflorescentiae scaposae superne laxe alternate ramosae, pedicellis et involucris glandulis longiuscule stipitatis dense obsitis. Capitula late campanulata; squamae involucri ca. 4-seriatae inaequales interiores longe attenuatae; receptacula subglabra. Flores ca. 40-75; radii 1-2-seriati

longi, corollis base perangustis; corollae disci anguste infundibulares, tubis minus angustis indistinctis hirsutis, lobis elongatis extus glabris vel uniglanduliferis marginaliter stomatiferis; filamenta antherarum laevia; thecae pallidae base non fimbriatae, cellulis exothecialibus ovalis in extremis nodiferis, appendices breviter ovatae 1-1 1/2 longiores quam latiores laeves; rami stylorum angusti elongati ca. 20-30 longiores quam latiores. Achaenia obovata inferne parum angustiora valde 10-costata sparse setifera, raphidibus elongatis; carpodia breviter cylindrica, cellulis aliquantum magnis, parietibus nodiferis; series pappi exteriores anguste squamiformes interiores setiformes persistentes, apicibus cellularum simplicibus. Grana pollinis 35-45 μ diam, spinis regularibus interne simplicibus. Species typica: Liabum striatum Cuatr.

Pseudonoseris discolor (Muschler) H. Robinson & R.D. Brettell, comb. nov. Onoseris discolor Muschler, Engl. Bot. Jahrb. 50, Beibl. III: 94. 1913. syn. Liabum lanatum Ferreyra, Bol. Soc. Peru. Bot. 1: 17. 1948.

Pseudonoseris striatum (Cuatr.) H. Robinson & R.D. Brettell, comb. nov. Liabum striatum Cuatr., Collect. Bot., Barcinone 3: 306. 1953.

Pseudonoseris szyszlowiczii (Hieron.) H. Robinson & R.D. Brettell, comb. nov. Liabum szyszlowiczii Hieron., Engl. Bot. Jahrb. 36: 503. 1905.

SINCLAIRIA Hook. & Arn., Bot. Beech. Voy. 433. 1841. T.: Sinclairia discolor Hook. & Arn., originally monotypic. Sinclairiopsis Rydberg, North Am. Flora 34: 292. 1927. T.: Liabum klattii Robinson & Greenman, originally monotypic. Megaliabum Rydberg, North Am. Flora 34: 293. 1927. T.: Vernonia andrieuxii DC., original designation.

Sinclairia adenotricha (Greenm.) Rydb., North Am. Flora 34: 300. 1927. Liabum adenotrichum Greenm., Field Mus. Publ. Bot. 2: 349. 1912.

Sinclairia andrieuxii (DC.) H. Robinson & R.D. Brettell, comb. nov. Vernonia andrieuxii DC., Prod. 5: 16. 1836.

Sinclairia andromachioides (Less.) Rydb., N. Amer. Flora 34: 298. 1927. Vernonia andromachioides Less. Linnaea 6: 397. 1831.

Sinclairia blakei H. Robinson & R.D. Brettell, nom. nov. Vernonia hypoleuca DC., Prod. 5: 27. 1836.

Sinclairia brachypus Rhdb., North Am. Flora 34: 299. 1927.

Sinclairia caducifolia (B.L.Robinson & Bartlett) Rydb., North Am. Flora 34:299.1927. Liabum caducifolium B.L.Robinson & Bartlett, Proc. Amer. Acad. 43:59.1907.

Sinclairia deamii (B.L.Robinson & Bartlett) Rydb., North Am. Flora 34:299.1927. Liabum deamii B.L.Robinson & Bartlett, Proc. Amer. Acad. 43:60.1907.

Sinclairia deppeana (Less.) Rydb., North. Am. Flora 34:300.1927. Andromachia deppeana Less., Linnaea 6:401.1831.

Sinclairia dimidia (Blake) H.Robinson & R.D.Brettell, comb. nov. Liabum dimidium Blake, Journ. Wash. Acad. Sci. 22:385.1932.

Sinclairia discolor Hook. & Arn., Beech. Voy. 433.1841.

Sinclairia glabra (Hemsl.) Rydb., North. Am. Flora 34:297.1927. Liabum glabrum Hemsl., Biol. Centr. Am. Bot. 2:232.1881.

Sinclairia hypochlora (Blake) Rydb., North Am. Flora 34:301.1927. Liabum hypochlorum Blake, Contr. Gray Herb. N.S. 53:27.1918.

Sinclairia hypoleuca (Greenm.) Rydb., North Am. Flora 34:297.1927. Liabum glabrum var. hypoleucum Greenm., Proc. Am. Acad. 32:294.1897.

Sinclairia klattii (B.L.Robinson & Greenm.) H. Robinson & R.D. Brettell, comb. nov. Liabum klattii B.L. Robinson & Greenm., Am. Journ. Sci. Ser 3. 7:156.1895.

Sinclairia liebmannii (Klatt.) Sch. Bip. ex Rydberg, North Am., Flora 34:300.1927. Liabum liebmannii Klatt, Leopoldina 23:146.1887.

Sinclairia moorei (H.Robinson & R.D.Brettell) H.Robinson & R.D.Brettell, comb. nov. Liabum moorei H.Robinson & R.D.Brettell, Phytologia 27:252.1973.

Sinclairia pittieri Rydb., North Am. Flora 34:300.1927.

Sinclairia platylepis (Sch. Bip. ex Klatt) Rydb., North Am. Flora 34:296.1927. Liabum platylepis Sch. Bip. ex Klatt, Leopoldina 23:146.1887.

Sinclairia polyantha (Klatt) Rydb., North Am. Flora 34:299.1927. Liabum polyanthum Klatt, Bull. Soc. Roy. Bot. Belg. 31:209.1892.

Sinclairia pringlei (B.L.Robinson & Greenm.) H.Robinson & R.D.Brettell, comb. nov. Liabum pringlei B.L. Robinson & Greenm., Proc. Amer. Acad. 32:49.1896.

Sinclairia sericolepis (Hemsl.) Rydb., North Am. Flora 34:301.1927.
Liabum sericolepis Hemsl., Biol. Centr. Am. Bot. 2:232.1881.

Sinclairia similis (McVaugh) H. Robinson & R.D. Brettell, comb. nov.
Liabum simile McVaugh, Contr. Univ. Mich. Herb. 9:468.1972.

Sinclairia subglandularis (Blake) Rydb., North Am. Flora 34:298.
 1927. Liabum subglandulare Blake, Contr. U.S. Nat. Herb.
 24:31.1922.

Sinclairia sublobata (B.L. Robinson) Rydb., North Am. Flora 34:297.
 1927. Liabum sublobatum B.L. Robinson, Proc. Amer. Acad.
 51:539.1916.

Sinclairia tajumulcensis (Standley & Steyerm.) H. Robinson & R.
 D. Brettell, comb. nov. Liabum tajumulcense Standley &
 Steyerm., Publ. Field Mus. Nat. Hist. Chicago. Bot. Ser.
 23:27.1943.

Sinclairia tonduzii (B.L. Robinson) Rydb., North Am. Flora 34:298.1927.
Liabum tonduzii B.L. Robinson, Proc. Bost. Soc. Nat. Hist.
 31:270.1904.

Sinclairia vagans (Blake) H. Robinson & R.D. Brettell, comb. nov.
Liabum vagans Blake, Brittonia 2:354.1937.

Species excluded from the tribe

Liabum bolivianum Klatt, Ann. K.K. Naturh. Hofmus. Wien, 9:362.
 1894. = Gynoxys boliviana (Klatt) Blake, Contrib. Gray
 Herb. n.s. 53:28.1918.

Liabum columbianum Klatt, Engl. Bot. Jahrb. 8:47.1887(1886) =
Gynoxys columbiana (Klatt) Hieron., Engl. Bot. Jahrb.
 28:630.1901.

Liabum eupatorioides Muschler, Engl. Bot. Jahrb. 50, Beibl.
 III:83.1913. = Schistocarpha sinforosii Cuatr., Trab.
 Mus. Cienc. Nat., Madrid, Ser. Bot., no. 29:43.1935. not
Schistocarpha eupatorioides Hieron. in Sod., Engl. Bot.
 Jahrb. 29:63. 1901 (1900).

Liabum homogamum Hieron., Engl. Bot. Jahrb. 28:626. 1901. =
Neomirandea homogama (Hieron.) H. Robinson & R.D. Brettell,
 n. comb. Syn. Neomirandea standleyi (B.L. Robinson) R.M.
 King & H. Robinson; Eupatorium brenesii Standley, Publ.
 Field Mus. Nat. Hist., Chicago, Bot. Ser., 18:1461.1938.

Liabum lechleri Sch. Bip., Bonplandia 3:236. 1855. =
Diplostephium lechleri (Sch. Bip.) Wedd., Chlor. And.
1:204.1857.

Literature Cited

- Bentham, G. 1873. Notes on the classification, history, and geographical distribution of Compositae. Journ. Linn. Soc. Bot. 13:335-577, pl. 8-11.
- Cabrera, A.L. 1960. Notas sobre tipos de Compuestas Sudamericanas en herbarios europeos. III, los tipos de Ruiz y Pavon. Bol. Soc. Argentina Bot. 8:195-215.
- Hoffmann, O. 1894. Compositae. in Engler and Prantl, Die Natürlichen Pflanzenfamilien 4(5):87-391.
- Robinson, H. and R.D. Brettell 1973. Tribal revisions in the Asteraceae. III. A new tribe, Liabeae. Phytologia 25:404-407.
- Robinson, H. and J. Cuatrecasas 1973. Synopsis of the genus Philoglossa (Liabeae, Asteraceae). Phytologia 26:381-388.
- Ruiz, H. and J.A. Pavon 1794. Florae Peruviana et Chilensis Prodromus. Madrid.
- _____ and _____ 1798. Systema Vegetabilium Florae Peruviana et Chilensis. Vol. 1. Madrid.